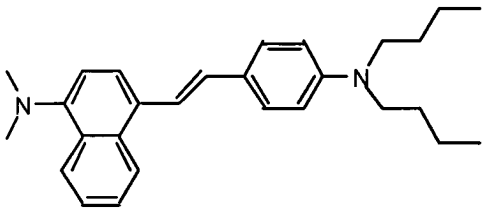
Listing of Claims:

1-2. (Cancelled)

3. (Previously presented) A method for preparing a compound in an electronically excited state, comprising the steps of:

a) exposing a compound having the formula D_1-Π-D_2 to radiation, wherein D_1 and D_2 are electron donor groups; and Π comprises a bridge of π-conjugated bonds connecting D_1 and D_2; and

b) converting said compound to a multi-photon electronically excited state upon simultaneous absorption of at least two photons of said radiation by said compound, wherein the sum of the energies of all of said absorbed photons is greater than or equal to the transition energy from a ground state of said compound to said multi-photon excited state and wherein the energy of each absorbed photon is less than the transition energy between said ground state and the lowest single-photon excited state of said compound and is less than the transition energy between said multi-photon excited state and said ground state, wherein said compound is selected from the group consisting of



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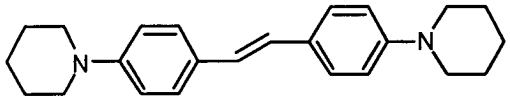

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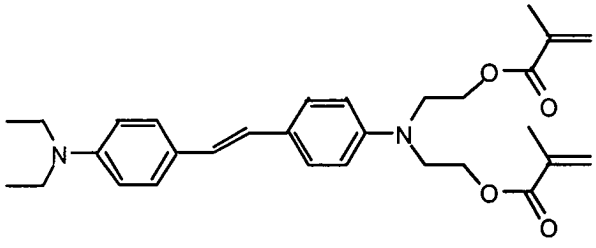

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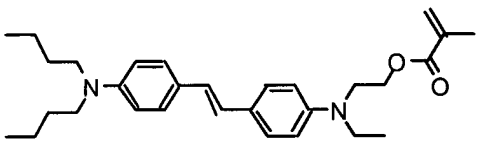

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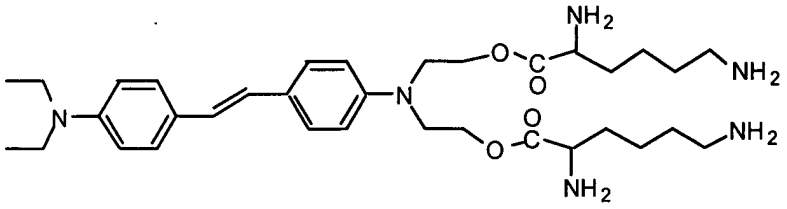

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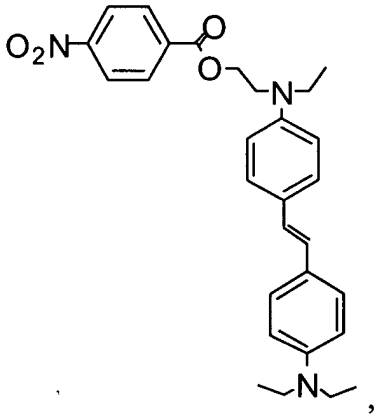

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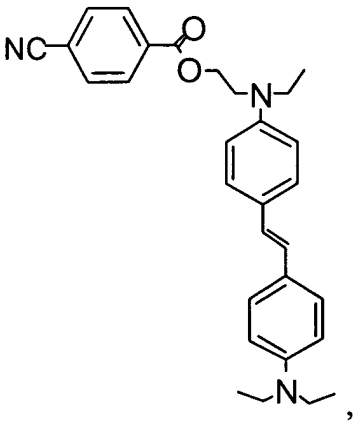

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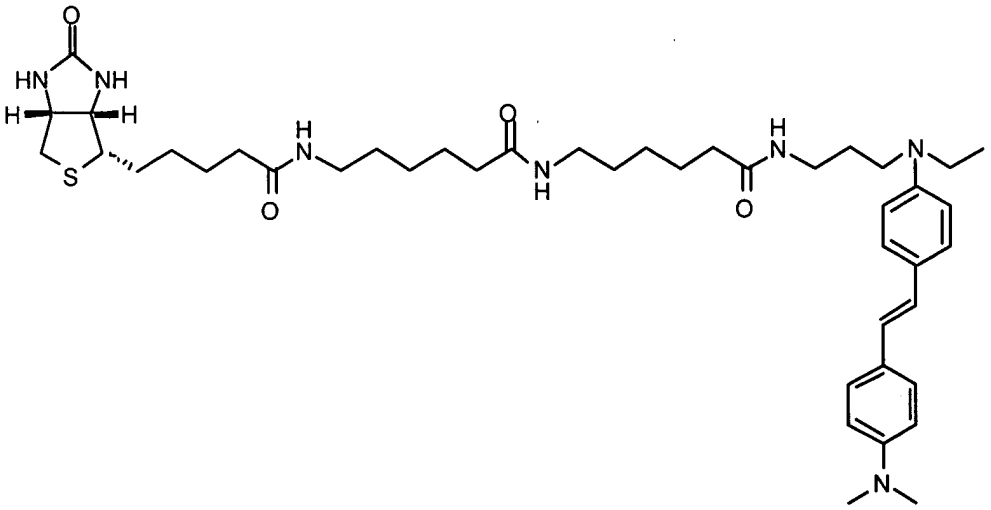

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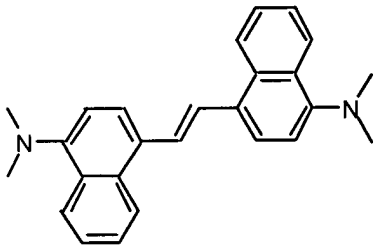

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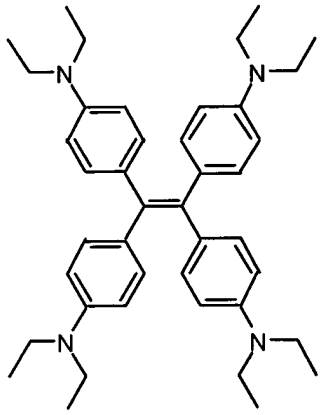

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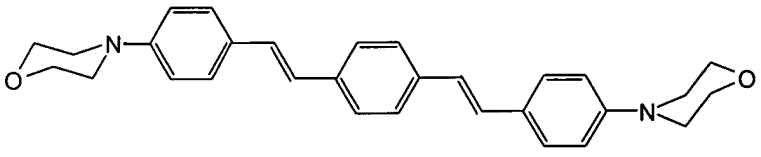

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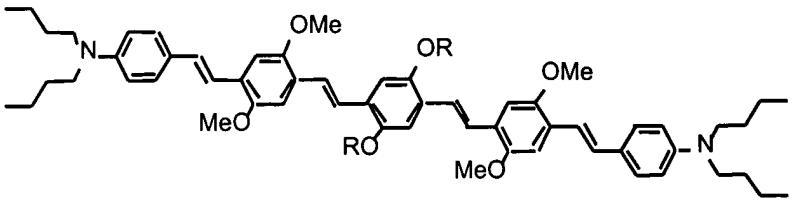

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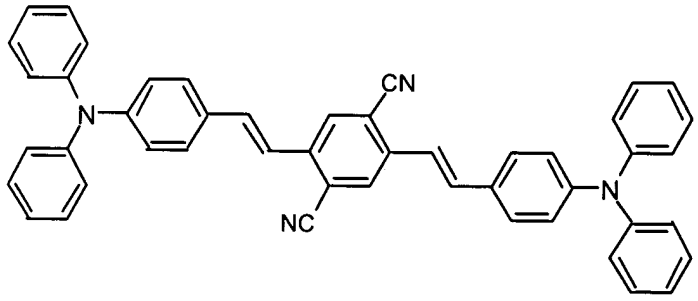
CN
N
NC
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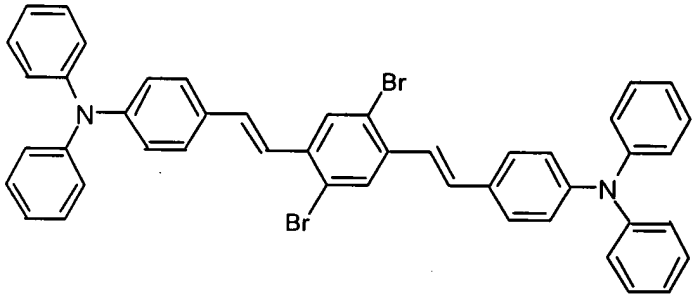
Br
N
Br
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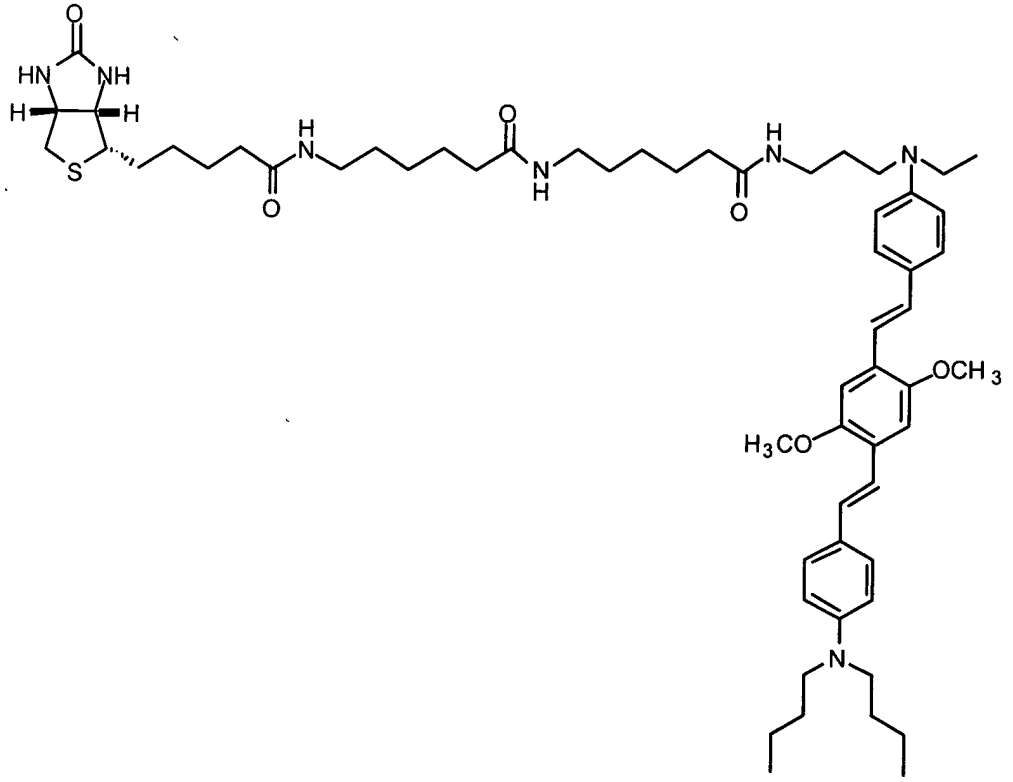
O
HN
NH
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OCH3
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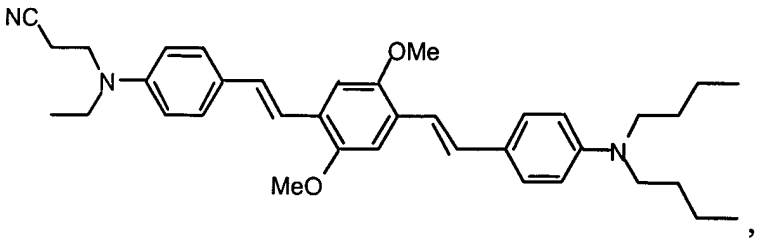
NC
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OMe
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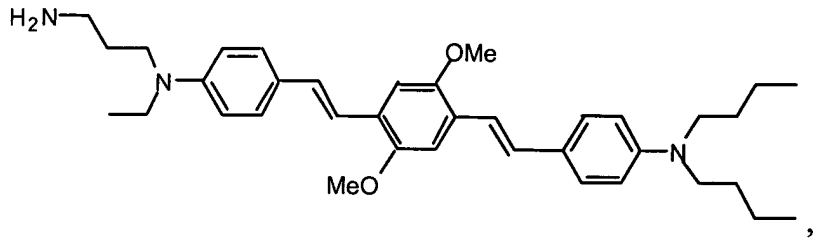


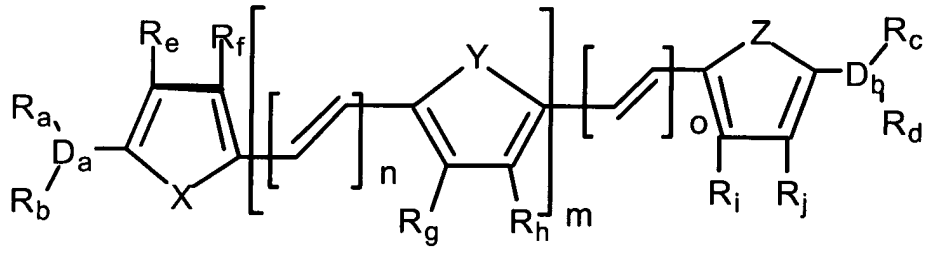
and mixtures thereof, where $R=(CH_2)_{11}CH_3$.

4-15. (Cancelled)

16. (Currently Amended) A method for preparing a compound in an electronically excited state, comprising the steps of:

a) exposing a compound having the formula D_1-Π-D_2 to radiation of a wavelength within a multiphoton absorption peak of said compound, wherein D_1 and D_2 are electron donor groups; and Π comprises a bridge of π-conjugated bonds connecting D_1 and D_2; and

b) converting said compound to a multi-photon electronically excited state upon simultaneous absorption of at least two photons of said radiation by said compound, wherein the sum of the energies of all of said absorbed photons is greater than or equal to the transition energy from a ground state of said compound to said multi-photon excited state and wherein the energy of each absorbed photon is less than the transition energy between said ground state and the lowest single-photon excited state of said compound and is less than the transition energy between said multi-photon excited state and said ground state, wherein said compound is further defined by a formula



where D_a is selected from the group consisting of N, O, S, and P;

where D_b is selected from the group consisting of N, O, S, and P;

m, n, o are integers such that $0 \leq m \leq 10$, $0 \leq n \leq 10$, and $0 \leq o \leq 10$; and

where:

X, Y, Z are independently selected from the group consisting of $CR_k=CR_l$, O, S, and $N\text{-}R_m$;

R_a, R_b, R_c, R_d are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{a1}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{a2}R_{a3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{a2}R_{a3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl, a group of aromatic rings having up to 20 carbons in the aromatic ring framework, fused aromatic rings, vinyl, allyl, 4-styryl, acroyl, methacroyl, acrylonitrile, isocyanate, isothiocyanate, epoxides, strained ring olefins, $(-CH_2)_\delta SiCl_3$, $(-CH_2)_\delta Si(OCH_2CH_3)_3$, and $(-CH_2)_\delta Si(OCH_3)_3$, where $0< \delta < 25$;

wherein one of Ra and Rb is not present when Da is O or S, and wherein one of Rc and Rd is not present when Db is O or S;

R_e, R_f, R_g, R_h, R_i, R_j, R_k, R_l and R_m are independently selected from the group consisting of, H, a linear or branched alkyl group with up to 25 carbons, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{b1}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{b2}R_{b3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{b2}R_{b3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl, a group of aromatic rings having up to 20 carbons in the aromatic framework, fused aromatic rings, CHO, CN, NO_2, Br, Cl, I, phenyl, an acceptor group containing more than two carbon atoms, a functional group obtained by reaction with an amino acid, $NR_{e1}R_{e2}$, and OR_{e3};

where $0 < \alpha < 10$ and $1 < \beta < 25$;

R_{a1}, R_{a2}, and R_{a3} are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, and a functional group obtained by reaction with: an amino acid, a polypeptide, adenine, guanine, tyrosine, cytosine, uracil, biotin, ferrocene, ruthenocene, cyanuric chloride, or methacryloyl chloride;

R_{b1}, R_{b2}, and R_{b3} are each independently a functional group obtained by reaction with: an amino acid, a polypeptide, adenine, guanine, tyrosine, cytosine, uracil, biotin, ferrocene, ruthenocene, cyanuric chloride, or methacryloyl chloride;

R_{e1}, R_{e2}, R_{e3} are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{g1}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{g2}R_{g3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{g2}R_{g3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl, aryl groups, fused aromatic rings, vinyl, allyl, 4-styryl, acroyl, methacroyl, acrylonitrile, isocyanate, isothiocyanate, epoxides, strained ring olefins, $(-CH_2)_\delta SiCl_3$, $(-CH_2)_\delta Si(OCH_2CH_3)_3$, and $(-CH_2)_\delta Si(OCH_3)_3$, where $0< \delta < 25$;

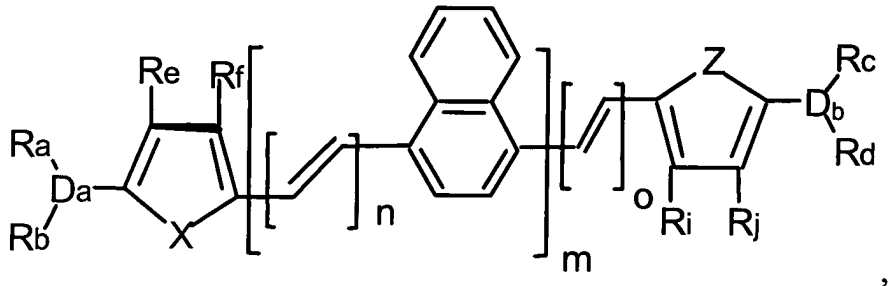
R_{g1}, R_{g2}, and R_{g3} are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, and a functional group obtained by reaction with:

an amino acid, a polypeptide, adenine, guanine, tyrosine, cytosine, uracil, biotin, ferrocene, ruthenocene, cyanuric chloride, or methacryloyl chloride.

17. (Currently Amended) A method for preparing a compound in an electronically excited state, comprising the steps of:

a) exposing a compound having the formula D_1-Π-D_2 to radiation of a wavelength within a multiphoton absorption peak of said compound, wherein D_1 and D_2 are electron donor groups; and Π comprises a bridge of π-conjugated bonds connecting D_1 and D_2; and

b) converting said compound to a multi-photon electronically excited state upon simultaneous absorption of at least two photons of said radiation by said compound, wherein the sum of the energies of all of said absorbed photons is greater than or equal to the transition energy from a ground state of said compound to said multi-photon excited state and wherein the energy of each absorbed photon is less than the transition energy between said ground state and the lowest single-photon excited state of said compound and is less than the transition energy between said multi-photon excited state and said ground state, wherein said compound is further defined by a formula



where D_a is selected from the group consisting of N, O, S, and P;

where D_b is selected from the group consisting of N, O, S, and P;

m, n, o are integers such that $0 \leq m \leq 10$, $0 \leq n \leq 10$, and $0 \leq o \leq 10$; and

where:

X, Y, Z are independently selected from the group consisting of $CR_k=CR_l$, O, S, and $N\text{-}R_m$;

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wherein one of Ra and Rb is not present when Da is O or S, and wherein one of Rc and Rd is not present when Db is O or S;

R_e, R_f, R_i, R_j, R_k, R_l and R_m are independently selected from the group consisting of, H, a linear or branched alkyl group with up to 25 carbons, $-(CH_2CH_2O)_\alpha\text{-}(CH_2)_\beta OR_{b1}$, $-(CH_2CH_2O)_\alpha\text{-}(CH_2)_\beta NR_{b2}R_{b3}$, $-(CH_2CH_2O)_\alpha\text{-}(CH_2)_\beta CONR_{b2}R_{b3}$, $-(CH_2CH_2O)_\alpha\text{-}(CH_2)_\beta CN$, $-(CH_2CH_2O)_\alpha\text{-}(CH_2)_\beta Cl$, $-(CH_2CH_2O)_\alpha\text{-}(CH_2)_\beta Br$, $-(CH_2CH_2O)_\alpha\text{-}(CH_2)_\beta I$, $-(CH_2CH_2O)_\alpha\text{-}(CH_2)_\beta$-Phenyl, a group of aromatic rings having up to 20 carbons in the aromatic framework, fused aromatic rings, CHO, CN, NO_2, Br, Cl, I, phenyl, an acceptor group containing more than two carbon atoms, a functional group obtained by reaction with an amino acid, $NR_{e1}R_{e2}$, and OR_{e3};

where $0 < \alpha < 10$ and $1 < \beta < 25$;

R_{a1}, R_{a2}, and R_{a3} are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, and a functional group obtained by reaction with: an amino acid, a polypeptide, adenine, guanine, tyrosine, cytosine, uracil, biotin, ferrocene, ruthenocene, cyanuric chloride, or methacryloyl chloride;

R_{b1}, R_{b2}, and R_{b3} are each independently a functional group obtained by reaction with: an amino acid, a polypeptide, adenine, guanine, tyrosine, cytosine, uracil, biotin, ferrocene, ruthenocene, cyanuric chloride, or methacryloyl chloride;

R_{e1}, R_{e2}, R_{e3} are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{g1}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{g2}R_{g3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{g2}R_{g3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl, aryl groups, fused aromatic rings, vinyl, allyl, 4-styryl, acroyl, methacroyl, acrylonitrile, isocyanate, isothiocyanate, epoxides, strained ring olefins, $(-CH_2)_\delta SiCl_3$, $(-CH_2)_\delta Si(OCH_2CH_3)_3$, and $(-CH_2)_\delta Si(OCH_3)_3$, where $0 < \delta < 25$;

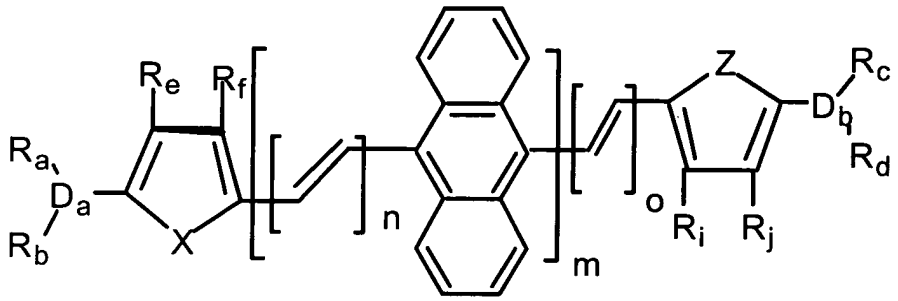
R_{g1}, R_{g2}, and R_{g3} are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, and a functional group obtained by reaction with: an amino acid, a polypeptide, adenine, guanine, tyrosine, cytosine, uracil, biotin, ferrocene, ruthenocene, cyanuric chloride, or methacryloyl chloride.

18. (Currently Amended) A method for preparing a compound in an electronically excited state, comprising the steps of:

a) exposing a compound having the formula D_1-Π-D_2 to radiation of a wavelength within a multiphoton absorption peak of said compound, wherein D_1 and D_2 are electron donor groups; and Π comprises a bridge of π-conjugated bonds connecting D_1 and D_2; and

b) converting said compound to a multi-photon electronically excited state upon simultaneous absorption of at least two photons of said radiation by said compound, wherein the sum of the energies of all of said absorbed photons is greater than or equal to the transition energy from a ground state of said compound to said multi-photon excited state and wherein the

energy of each absorbed photon is less than the transition energy between said ground state and the lowest single-photon excited state of said compound and is less than the transition energy between said multi-photon excited state and said ground state, wherein said compound is further defined by a formula



where D_a is selected from the group consisting of N, O, S, and P;

where D_b is selected from the group consisting of N, O, S, and P;

m, n, o are integers such that $0 \leq m \leq 10$, $0 \leq n \leq 10$, and $0 \leq o \leq 10$; and

where:

X, Y, Z are independently selected from the group consisting of $CR_k=CR_l$, O, S, and N-R_m;

R_a, R_b, R_c, R_d are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{a1}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{a2}R_{a3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{a2}R_{a3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl, a group of aromatic rings having up to 20 carbons in the aromatic ring framework, fused aromatic rings, vinyl, allyl, 4-styryl, acroyl, methacroyl, acrylonitrile, isocyanate, isothiocyanate, epoxides, strained ring olefins, $(-CH_2)_\delta SiCl_3$, $(-CH_2)_\delta Si(OCH_2CH_3)_3$, and $(-CH_2)_\delta Si(OCH_3)_3$, where $0 < \delta < 25$;

wherein one of Ra and Rb is not present when Da is O or S, and wherein one of Rc and Rd is not present when Db is O or S;

R_e, R_f, R_i, R_j, R_k, R_l and R_m are independently selected from the group consisting of, H, a linear or branched alkyl group with up to 25 carbons, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{b1}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{b2}R_{b3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{b2}R_{b3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$,

$-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl, a group of aromatic rings having up to 20 carbons in the aromatic framework, fused aromatic rings, CHO, CN, NO_2, Br, Cl, I, phenyl, an acceptor group containing more than two carbon atoms, a functional group obtained by reaction with an amino acid, $NR_{e1}R_{e2}$, and OR_{e3};

where $0 < \alpha < 10$ and $1 < \beta < 25$;

R_{a1}, R_{a2}, and R_{a3} are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, and a functional group obtained by reaction with:

an amino acid, a polypeptide, adenine, guanine, tyrosine, cytosine, uracil, biotin, ferrocene, ruthenocene, cyanuric chloride, or methacryloyl chloride;

R_{b1}, R_{b2}, and R_{b3} are each independently a functional group obtained by reaction with:

an amino acid, a polypeptide, adenine, guanine, tyrosine, cytosine, uracil, biotin, ferrocene, ruthenocene, cyanuric chloride, or methacryloyl chloride;

R_{e1}, R_{e2}, R_{e3} are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{g1}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{g2}R_{g3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{g2}R_{g3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$-Phenyl, aryl groups, fused aromatic rings, vinyl, allyl, 4-styryl, acroyl, methacroyl, acrylonitrile, isocyanate, isothiocyanate, epoxides, strained ring olefins, $(-CH_2)_\delta SiCl_3$, $(-CH_2)_\delta Si(OCH_2CH_3)_3$, and $(-CH_2)_\delta Si(OCH_3)_3$, where $0 < \delta < 25$;

R_{g1}, R_{g2}, and R_{g3} are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, and a functional group obtained by reaction with:

an amino acid, a polypeptide, adenine, guanine, tyrosine, cytosine, uracil, biotin, ferrocene, ruthenocene, cyanuric chloride, or methacryloyl chloride.